What is claimed is:

1. A method of fabricating dual damascene interconnections, the method comprising:

(a) forming on a substrate a hybrid dielectric layer having a dielectric constant of 3.3 or less;

(b) forming a via in the dielectric layer;

(c) filling the via with a carbon-free inorganic filler;

(d) partially etching the inorganic filler filling the via and the dielectric layer to form a trench, which is connected to the via and in which interconnections will be formed;

(e) removing the inorganic filler remaining in the via; and

(f) completing interconnections by filling the trench and the via with interconnection material.

2. The method of claim 1, further comprising, before step (a),:

forming a lower interconnection on the substrate; and

forming an etch stop layer on the lower interconnection.

3. The method of claim 2, wherein the etch stop layer is formed of at least one of SiC, SiN, and SiCN.

4. The method of claim 1, wherein the hybrid dielectric layer having a dielectric constant of 3.3 or less is an organo silicate glass layer.

5. The method of claim 1, wherein the hybrid dielectric layer having a dielectric constant of 3.3 or less is formed using chemical vapor deposition.

6. The method of claim 1, further comprising, before step (b), forming a capping layer on the hybrid dielectric layer having a dielectric constant of 3.3 or less,

wherein in step (b), a via is formed in the capping layer and the dielectric layer.

7. The method of claim 6, wherein the capping layer is formed of an anti-reflective material.

8. The method of claim 6, wherein the capping layer is formed of at least one of SiO_2, SiOF, SiON, SiC, SiN and SiCN.

9. The method of claim 2, wherein step (b) comprises:

forming a photoresist pattern on the dielectric layer to define the via; and

forming the via exposing the etch stop layer by dry etching the dielectric layer using the photoresist pattern as an etch mask.

10. The method of claim 1, wherein the carbon-free inorganic filler is an HSQ-based filler.

11. The method of claim 1, wherein the carbon-free inorganic filler further includes a light absorption material and/or a dissolution inhibitor for a photoresist developing solution.

12. The method of claim 1, further comprising, before step (d), at least one of (i) processing the surface of the carbon-free inorganic filler using plasma, (ii) forming an anti-reflection layer on the surface of the carbon-free inorganic filler, and (iii) processing the surface of the carbon-free inorganic filler using plasma and forming an anti-reflection layer on the plasma-processed surface of the carbon-free inorganic filler.

13. The method of claim 12, wherein the plasma is derived from O_2, H_2, He, NH_3, N_2, Ar, or any mixture thereof.

14. The method of claim 12, wherein the anti-reflection layer is an organic anti-reflection layer.

15. The method of claim 14, wherein the anti-reflection layer is formed to a thickness of about 500 Å to 700 Å.

16. The method of claim 1, wherein step (d) includes:

forming a photoresist pattern on the inorganic filler to define the trench;

forming the trench by dry etching using the photoresist pattern as an etch mask such that an etch ratio of the inorganic filler to the dielectric layer is 4:1 or lower; and

removing the photoresist pattern.

17. The method of claim 16, wherein the dry etching uses CxFy or CxHyFz as a main etching gas, and removing the photoresist pattern uses an H_2-based plasma.

18. The method of claim 1, wherein step (e) comprises wet etching such that an etch ratio of the inorganic filler to the dielectric layer is 20:1 or higher.

19. The method of claim 18, wherein the wet etching uses diluted HF, a mixture of NH_4F, HF, and deionized water.

20. The method of claim 1, wherein in step (f), the interconnection is a copper interconnection.

21. A method of fabricating dual damascene interconnections, the method comprising:

(a) forming an organo silicate glass layer on a substrate;

(b) forming a via in the organo silicate glass layer;

(c) filling the via with an HSQ-based filler;

(d) partially etching the HSQ-based filler filling the via and the organo silicate glass layer to form a trench, which is connected to the via and in which interconnections will be formed;

(e) removing the HSQ-based filler remaining in the via; and

(f) completing interconnections by filling the trench and the via with an interconnection material.

22. The method of claim 21, wherein in step (a), the organo silicate glass layer is formed using chemical vapor deposition.

23. The method of claim 21, further comprising, before step (a),:

forming a lower interconnection on the substrate; and

forming an etch stop layer on the lower interconnection.

24. The method of claim 23, wherein the etch stop layer is formed of at least one of SiC, SiN, and SiCN.

25. The method of claim 21, further comprising, before step (b), forming a capping layer on the organo silicate glass layer.

26. The method of claim 25, wherein the capping layer is formed of an anti-reflective material.

27. The method of claim 25, wherein the capping layer is formed of at least one of SiO_2, SiOF, SiON, SiC, SiN, and SiCN.

28. The method of claim 23, wherein step (b) comprises:

forming a photoresist pattern on the organo silicate glass layer to define the via; and

forming the via exposing the etch stop layer by dry etching the organo silicate glass layer using the photoresist pattern as an etch mask.

29. The method of claim 21, wherein the HSQ-based filler further includes a light absorption material and/or a dissolution inhibitor for a photoresist developing solution.

30. The method of claim 21, further comprising, before step (d), at least one of (i) processing the surface of the HSQ-based filler using plasma, (ii) forming an anti-reflection layer on the surface of the HSQ-based filler, and (iii) processing the surface of the HSQ-based filler using plasma and then forming an anti-reflection layer on the plasma-processed surface of the HSQ-based filler.

31. The method of claim 30, wherein the plasma is O_2, H_2, He, NH_3, N_2, Ar, or any mixture thereof.

32. The method of claim 30, wherein the anti-reflection layer is an organic anti-reflection layer.

33. The method of claim 32, wherein the anti-reflection layer is formed to a thickness of about 500 Å to 700 Å.

34. The method of claim 21, wherein step (d) includes:

forming a photoresist pattern on the HSQ-based filler to define the trench;

forming the trench by dry etching using the photoresist pattern as an etch mask such that an etch ratio of the HSQ-based filler to the organo silicate glass layer is 4:1 or lower; and

removing the photoresist pattern.

35. The method of claim 34, wherein the dry etching uses CxFy or CxHyFz as a main etching gas, and removing the photoresist pattern uses an H_2-based plasma.

36. The method of claim 21, wherein step (e) comprises wet etching such that an etch ratio of the HSQ-based filler to the organo silicate glass layer is 20:1 or higher.

37. The method of claim 36, wherein the wet etching uses diluted HF or a mixture of NH_4F, HF, and deionized water.

38. The method of claim 21, wherein in step (f), the interconnection is a copper interconnection.

39. A method of fabricating dual damascene interconnections, the method comprising:

(a) forming a lower interconnection on a substrate;

(b) forming an etch stop layer on the lower interconnection;

(c) forming an organo silicate glass layer using chemical vapor deposition on the etch stop layer;

(d) forming a via through the organo silicate glass layer to expose the etch stop layer;

(e) filling the via with an HSQ-based filler;

(f) processing the surface of the HSQ-based filler using plasma;

(g) forming an anti-reflection layer on the plasma-processed surface of the HSQ-based filler;

(h) partially etching the anti-reflection layer, the HSQ-based filler filling the via, and the organo silicate glass layer to form a trench, which is connected to the via and in which interconnections will be formed;

(i) removing the HSQ-based filler remaining in the via; and

(k) completing interconnections by filling the trench and the vias with an interconnection material.

40. The method of claim 39, wherein the etch stop layer is formed of at least one of SiC, SiN, and SiCN.

41. The method of claim 39, before step (d), further comprising forming a capping layer on the organo silicate glass layer.

42. The method of claim 41, wherein the capping layer is formed of an anti-reflective material.

43. The method of claim 41, wherein the capping layer is formed of at least one of SiO_2, SiOF, SiON, SiC, SiN, and SiCN.

44. The method of claim 39, wherein the HSQ-based filler further includes a light absorption material and/or a dissolution inhibitor for a photoresist developing solution.

45. The method of claim 39, wherein the plasma is O_2, H_2, He, NH_3, N_2, Ar, or any mixture thereof.

46. The method of claim 39, wherein the anti-reflection layer is an organic anti-reflection layer.

47. The method of claim 46, wherein the anti-reflection layer is formed to a thickness of about 500 Å to 700 Å.

48. The method of claim 39, wherein step (h) includes:

forming a photoresist pattern on the anti-reflection layer to define the trench;

forming the trench by dry etching using the photoresist pattern as an etch mask such that an etch ratio of the HSQ-based filler to the organo silicate glass layer is 4:1 or lower; and

removing the photoresist pattern.

49. The method of claim 48, wherein the dry etching uses CxFy or CxHyFz as a main etching gas, and removing the photoresist pattern uses an H_2-based plasma.

50. The method of claim 39, wherein step (i) comprises wet etching such that an etch ratio of the HSQ-based filler to the organo silicate glass layer is 20:1 or higher.

51. The method of claim 50, wherein the wet etching uses diluted HF or a mixture of NH_4F, HF, and deionized water.

52. The method of claim 39, wherein in step (k), the interconnection is a copper interconnection.